RESEARCH

Cariboo Forest Region

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EXTENSION NOTE #14
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Wildlife Diversity in Managed High Elevation Forests

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Engelmann spruce-subalpine fir (ESSF) forests grow above 1200 m in elevation in the Quesnel Highland of the Cariboo Forest Region. These high elevation forests have experienced infrequent stand-destroying fires, resulting in a landscape with relatively unbroken tracts of uneven-aged old forests. Currently, about 65% of them are older than 140 years. If plans are to maintain natural landscape characteristics, then a relatively high proportion of forests with mature and old forest attributes is required.

The management of these forests is complex because of their high values of biodiversity, timber, visual quality, and water quality and yield, along with specific habitat requirements of high profile and sensitive wildlife species, such as mountain caribou. Even-aged management through conventional clearcutting does not address the requirements of all these resources and additional silvicultural systems are needed to provide further options.

GROUP SELECTION STUDY

Group selection silvicultural systems are being tested in the Engelmann spruce-subalpine fir wet cold variant (ESSFwc3) at Grain and Blackbear Creeks, near Likely, B.C. Each of four sites was split into four 10 ha treatment units. The group selection treatments have opening sizes of .03, .13, and 1.0 ha with a non-harvested control. All sites were harvested in 1992 and 1993. This project is outlined in more detail in **Extension Note #9**.

MOUNTAIN CARIBOU

Mountain caribou are a key management species in British Columbia. They have been *blue-listed*, and are considered vulnerable by BC Environment. Habitat loss and fragmentation threaten their long-term survival.

Mountain caribou spend much of the year in high elevation ESSF forests. During the winter, they feed mainly on arboreal (tree-borne) lichens. Conventional clearcutting eliminates this winter food source. Lichen dispersal, establishment and growth are slow, and therefore, a clearcut site may never attain substantial quantities of lichen before the next harvest. Specialized group selection systems that retain old forest stand structure and attributes, including adequate levels of arboreal lichen in perpetuity, may be compatible with the maintenance of caribou habitat.

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Landscape level planning is necessary to protect mountain caribou. Appropriate access and predator management plans must complement habitat management for caribou. Access increases the risk of illegal hunting and harassment, and it may also influence predators' mobility.

If caribou are squeezed into smaller islands of suitable habitat, they become more vulnerable to predators, such as wolves and grizzly bears. It is well documented that caribou require large areas of suitable habitat to avoid predators. Low densities are an effective survival strategy, and caribou disperse themselves widely across the landscape to increase their separation from predators. Moose, the primary prey for wolves, prefer shrubby, early seral forests. When moose are present in high elevation forests, so are wolves, which increases the chance of predation on caribou.

ARBOREAL LICHEN

The amount and pattern of harvesting may affect the microclimate of the forest and thus the growing conditions for arboreal lichen. For this trial, lichen growth rates are being monitored in all group selection treatments and adjacent old forest controls. Lichen growth is measured by recording annual weight changes of the samples (originally about 0.05 g).

The abundance of arboreal lichen within the caribou feeding zone (up to 4.5 m above ground) was measured on 1220 trees distributed among four study sites. Over all sites, 20% of the trees were dead and supported about 12% of the total lichen. Live and dead spruce trees together supported 18% of the total lichen, which was proportional to their representation in the stand. More than half the trees (live and dead) were small subalpine fir (10-30 cm diameter), which had 47% of the total quantity of lichen. The 30-50 cm diameter class of live subalpine fir had the most lichen per tree.

SMALL MAMMALS

Small mammals are an important component of high elevation ecosystems. They form a substantial prey base for larger mammals, such as marten and long-tailed weasels, and birds of prey. Small mammals may also affect the success of natural and artificial regeneration on harvested sites by consuming both seeds and seedlings.

The impact of habitat manipulation is quite easily measured using small mammals, since they occur in large numbers with small home ranges. Live trapping was used in this trial to assess the effects of partial cutting treatments on the abundance, species composition and diversity of small mammals. All treatments were dominated by red-backed voles. Prior to harvesting, there were relatively high densities of small mammals (approximately 28/ha) found on the sites, which is expected to ensure an adequate prey population for predators. Post-harvesting results will be available later in 1994.

BIRDS

The old forests of the ESSF zone host a high diversity and abundance of bird species. Initial surveys found that more than 25% of the breeding bird species from the provincial list were detected in various ESSF habitats in the Quesnel Highlands. This is a high proportion, given the zone's adverse climatic conditions and short breeding season.

The abundance, diversity and species composition of bird communities of young clearcuts are very different from those of old forests. However, bird communities in the group selection treatments closely resembled those of old forests. One year after harvesting, there were no significant differences among the treatments and old forest controls for species richness and number of breeding bird territories.

Within the group selection treatments, there was a significantly greater abundance of dark-eyed juncos in large and medium sized opening treatments, more Swainson's and varied thrushes in old forest controls, and a greater abundance of hermit thrushes in the large opening treatments compared to the small openings. In the small openings, canopy dwellers moved across openings and skid trails frequently; therefore, breeding territories appear to encompass these habitats. However, large openings may not meet the forage and nesting requirements of some species, and may increase the risk of predation. For example, the golden-crowned kinglet set up territories only in the forested areas of the treatment.

A 30% reduction in the volume of the stand, area of forest, or number of trees within a group selection treatment does not necessarily equate to a similar decrease in territory size or number for some species. The placement and size of territories are also functions of population dynamics, availability of specific habitat attributes within a territory, and animal behaviour.

SUMMARY

This project will continue beyond preliminary results to report on the impacts of group selection on the diversity of mammals, birds and amphibians at high elevations. The results will be used in developing management guidelines for maintaining wildlife diversity in Engelmann spruce-subalpine fir forests.

CONTACTS

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